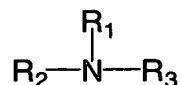


WHAT IS CLAIMED IS:

1. An ink jet ink composition comprising at least water, a colorant and a water-soluble organic solvent, wherein the ink jet ink composition comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

Formula (1)



wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

2. An ink jet ink composition according to claim 1, wherein in the formula (1), two of the three substituents represented by R_1 , R_2 and R_3 comprise a hydrocarbon group having a hydroxyl group.

3. An ink jet ink composition according to claim 1, wherein the hydroxyl group is positioned at the terminal of the hydrocarbon group having the hydroxyl group.

4. An ink jet ink composition according to claim 1, wherein the hydrocarbon group having the hydroxyl group comprises a hydroxyalkyl group.

5. An ink jet ink composition according to claim 1, wherein the hydrocarbon group having the hydroxyl group comprises a linear hydroxyalkyl group having 1 to 5 carbon atoms.

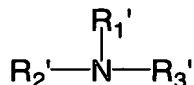
6. An ink jet ink composition according to claim 1, wherein a melting point or decomposition point of the amine compound is 50°C or more.

7. An ink jet ink composition according to claim 1, wherein a surface tension of the ink composition is 40 mN/m or less.

8. An ink jet ink composition comprising at least water, a colorant and a water-soluble organic solvent, wherein the ink jet ink composition comprises at least one amine compound

represented by the following formula (2):

Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

9. An ink jet ink composition according to claim 8, wherein a content of the amine compound is in a range of 5 to 30% by mass.

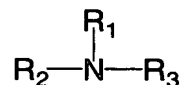
10. An ink jet ink composition according to claim 8, wherein the amine compound is selected from the group consisting of N,N-bis(hydroxyalkyl)glycine derivatives and N,N-bis(hydroxyalkyl)-2-aminoethanesulfonic acid derivatives.

11. An ink jet ink composition according to claim 8, wherein a melting point or decomposition point of the amine compound is 50°C or more.

12. An ink jet ink composition according to claim 8, wherein a surface tension of the ink composition is 40 mN/m or less.

13. An ink jet recording method comprising forming an image by adhering an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, to a recording medium, wherein the ink jet ink composition comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

Formula (1)

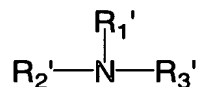


wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen,

an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

14. An ink jet recording method comprising forming an image by adhering an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, to a recording medium, wherein the ink jet ink composition comprises at least one amine compound represented by the following formula (2):

Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

15. An ink jet recording apparatus comprising at least

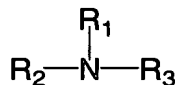
a recording head including a liquid ejection surface having a nozzle for ejecting a liquid, and a recording medium transfer section for transferring a recording medium in one direction while the recording medium faces the liquid ejection surface and a shortest distance between the recording medium and the liquid ejection surface is constantly maintained, wherein:

during printing, an image is formed by ejecting the liquid onto a surface of the recording medium from the liquid ejection surface while moving the recording head in a direction substantially perpendicular to the transfer direction of the recording medium;

an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent is used as the liquid; and

the ink jet ink composition comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass,

Formula (1)



wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and

none of the three substituents contain an alkyl group having at its terminal either one of $-\text{CO}_2\text{M}$ and $-\text{SO}_3\text{M}$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

16. An ink jet recording apparatus according to claim 15, wherein the shortest distance between the liquid ejection surface and the recording medium is in a range of 1.0 mm to 2.0 mm, and a largest length of the liquid ejection surface in the recording medium transfer direction is 2.54 cm or more.

17. An ink jet recording apparatus comprising at least a recording head including a liquid ejection surface having a nozzle for ejecting a liquid, and a recording medium transfer section for transferring a recording medium in one direction while the recording medium faces the liquid ejection surface and a shortest distance between the recording medium and the liquid ejection surface is constantly maintained, wherein:

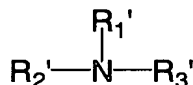
during printing, an image is formed by ejecting the liquid onto a surface of the recording medium from the liquid ejection surface while moving the recording head in a direction substantially perpendicular to the transfer direction of the recording medium;

an ink jet ink composition comprising at least water, a

colorant and a water soluble organic solvent is used as the liquid; and

the ink jet ink composition comprises at least one amine compound represented by the following formula (2),

Formula (2)

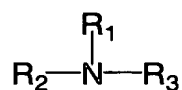


wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

18. An ink jet recording apparatus according to claim 17, wherein the shortest distance between the liquid ejection surface and the recording medium is in a range of 1.0 mm to 2.0 mm, and a largest length of the liquid ejection surface in the recording medium transfer direction is 2.54 cm or more.

19. An ink set comprising at least two inks which each comprise water, a colorant and a water soluble organic solvent, wherein at least one ink in the ink set comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

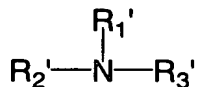
Formula (1)



wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

20. An ink set comprising at least two inks which each comprise water, a colorant and a water soluble organic solvent, wherein at least one ink in the ink set comprises at least one amine compound represented by the following formula (2):

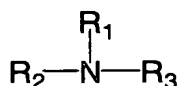
Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

21. An ink jet recording method comprising forming an image by using an ink set containing at least two inks comprising at least water, a colorant and a water soluble organic solvent, and by adhering an ink of the ink set to a recording medium, wherein at least one ink of the ink set comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

Formula (1)

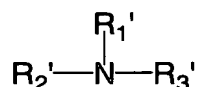


wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one

of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

22. An ink jet recording method comprising forming an image by using an ink set containing at least two inks comprising at least water, a colorant and a water soluble organic solvent, and by adhering an ink of the ink set to a recording medium, wherein at least one ink of the ink set comprises at least one amine compound represented by the following formula (2):

Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents

an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

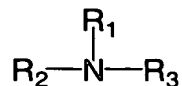
23. An ink jet recording apparatus comprising at least a recording head including a liquid ejection surface having at least two nozzles for independently ejecting at least two liquids, and a recording medium transfer section for transferring a recording medium in one direction while the recording medium faces the liquid ejection surface and a shortest distance between the recording medium and the liquid ejection surface is constantly maintained, wherein:

during printing, an image is formed by ejecting the at least two liquids onto a surface of the recording medium from the liquid ejection surface while moving the recording head in a direction substantially perpendicular to the transfer direction of the recording medium;

an ink set comprising at least two inks comprising at least water, a colorant and a water soluble organic solvent is used as the at least two liquids; and

at least one ink in the ink set comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass,

Formula (1)



wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

24. An ink jet recording apparatus comprising at least a recording head including a liquid ejection surface having at least two nozzles for independently ejecting at least two liquids, and a recording medium transfer section for transferring a recording medium in one direction while the recording medium faces the liquid ejection surface and a shortest distance between the recording medium and the liquid ejection surface is constantly maintained, wherein:

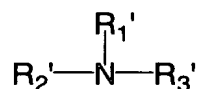
during printing, an image is formed by ejecting the at least two liquids onto a surface of the recording medium from the liquid ejection surface while moving the recording head in a direction substantially perpendicular to the transfer

direction of the recording medium;

an ink set comprising at least two inks comprising at least water, a colorant and a water soluble organic solvent is used as the at least two liquids; and

at least one ink in the ink set comprises at least one amine compound represented by the following formula (2):

Formula (2)

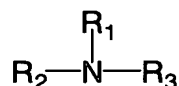


wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

25. A colorless ink jet treatment liquid which is used together with an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, during printing, and comprises at least water and a water soluble

organic solvent, wherein the ink jet treatment liquid comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

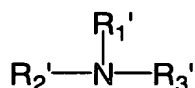
Formula (1)



wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

26. A colorless ink jet treatment liquid which is used together with an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, during printing, and comprises at least water and a water soluble organic solvent, wherein the ink jet treatment liquid comprises at least one amine compound represented by the following formula (2):

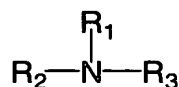
Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

27. An ink jet recording method comprising forming an image by adhering an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, and a colorless ink jet treatment liquid comprising at least water and a water soluble organic solvent, to approximately the same region on a recording medium, wherein the ink jet treatment liquid comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

Formula (1)

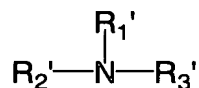


wherein the amine compound represented by the formula (1)

is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

28. An ink jet recording method comprising forming an image by adhering an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, and a colorless ink jet treatment liquid comprising at least water and a water soluble organic solvent, to approximately the same region on a recording medium, wherein the ink jet treatment liquid comprises at least one amine compound represented by the following formula (2):

Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl

group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

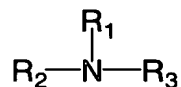
29. An ink jet recording apparatus comprising at least a recording head including a liquid ejection surface comprising at least two nozzles for independently ejecting at least two liquids, and a recording medium transfer section for transferring a recording medium in one direction while the recording medium faces the liquid ejection surface and a shortest distance between the recording medium and the liquid ejection surface is constantly maintained, wherein:

during printing, an image is formed by ejecting the at least two liquids onto a surface of the recording medium from the liquid ejection surface while moving the recording head in a direction substantially perpendicular to the transfer direction of the recording medium;

an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, and a colorless ink jet treatment liquid comprising at least water and a water soluble organic solvent are used as the at least two liquids; and

the ink jet treatment liquid comprises at least one amine compound represented by the following formula (1) in a range of 10 to 30% by mass:

Formula (1)



wherein the amine compound represented by the formula (1) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1 , R_2 and R_3 in the formula (1) comprises a hydrocarbon group having a hydroxyl group; and none of the three substituents contain an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic amine group.

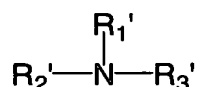
30. An ink jet recording apparatus comprising at least a recording head including a liquid ejection surface comprising at least two nozzles for independently ejecting at least two liquids, and a recording medium transfer section for transferring a recording medium in one direction while the recording medium faces the liquid ejection surface and a shortest distance between the recording medium and the liquid ejection surface is constantly maintained, wherein:

during printing, an image is formed by ejecting the at least two liquids onto a surface of the recording medium from the liquid ejection surface while moving the recording head in a direction substantially perpendicular to the transfer direction of the recording medium;

an ink jet ink composition comprising at least water, a colorant and a water soluble organic solvent, and a colorless ink jet treatment liquid comprising at least water and a water soluble organic solvent are used as the at least two liquids; and,

the ink jet treatment liquid comprises at least one amine compound represented by the following formula (2),

Formula (2)



wherein the amine compound represented by the formula (2) is any one of primary to tertiary amine compounds; at least one of three substituents represented by R_1' , R_2' and R_3' in the formula (2) comprises a hydrocarbon group having a hydroxyl group; and at least one of the three substituents comprises a hydrocarbon group containing an alkyl group having at its terminal either one of $-CO_2M$ and $-SO_3M$ in which M represents an atom or an atomic group selected from hydrogen, an alkali metal, an alkaline earth metal, an ammonium group and an organic

amine group.